

# Optimized Commercial Steels for Naval Surface Ships

**Status:** Transitioned

## PROBLEM / OBJECTIVE

Traditionally, U.S. Navy surface ships have been constructed using a combination of military and commercial specification steels, with military specification steels used for critical applications. The Navy seeks to maximize the use of commercial steels to reduce acquisition and life-cycle costs, while maintaining acceptable performance. However, steels produced to commercial specifications must consistently provide adequate performance in critical applications when subjected to military-unique loads.

The objective of this project was to determine if American Bureau of Shipping (ABS) Grade EH-36 steel plate possesses adequate fracture toughness to eliminate MIL-S-16216 Grade HY-80 crack arrest strakes. Removal of HY-80 steel plate from the primary hull will result in a primary hull composed solely of EH-36, which will lower acquisition and life-cycle costs.

## ACCOMPLISHMENTS / PAYOFF

### ***Process Improvement:***

Low-sulfur, control-rolled EH-36 steel plate was chosen as the sole primary hull material for LPD 17, thus eliminating costly HY-80 crack arrest strakes. Life-cycle costs were reduced by eliminating expensive welding procedures required for HY-80 steel plate. Fabrication procedures, such as plate forming and flame straightening, were optimized and implemented to ensure the structural integrity of the LPD 17 hull.

### ***Implementation and Technology Transfer:***

Technology transfer to appropriate shipyards was accomplished through cooperation with NAVSEA technical codes and the LPD 17 Program Office. Annual meetings with project stakeholders were conducted to distribute technology and to promote technical interaction among participants. Project results were presented at national conferences to promote project success and to address industry comments. Material evaluation methods developed for this project were transferred to NAVSEA, NSWC-CD, and the shipyard technical centers to be used for evaluation of other materials and applied to other weapon platforms.



### ***Expected Benefits:***

The elimination of HY-80 crack arrest strakes created a single material hull design, which reduced shipyard inventory requirements, and resulted in a \$4.8M acquisition cost avoidance. Implementation of optimized EH-36 steel plate resulted in an additional \$4.0M acquisition cost avoidance, for a total of \$8.8M cost savings over the 12 ship series.

## TIME LINE / MILESTONE

Start Date: June 1997

End Date: October 2000

## FUNDING

Total ManTech Investment: \$1.2M (plate manufacturing task only)

Cost Share: None

## PARTICIPANTS

- Avondale Alliance Shipyards
- Bethlehem-Lukens Plate Division
- National Center for Excellence in Metalworking Technology
- Naval Sea Systems Command
- Naval Surface Warfare Center, Carderock Division